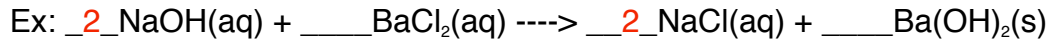


Notes: Stoichiometry (pg 274-287): (*Greek: stoicheion = element, metron = measure*)

- Mass relationships in chemical reactions.

- "How many grams of one thing can you make with this many grams of another thing?"

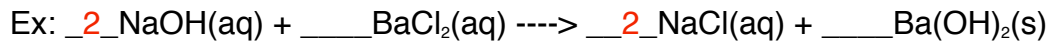
1. Key insight: the coefficients of a balanced equation tell you how many molecules or moles of each substance in the reaction go with each other.



2 molecules of NaOH + 1 molecule BaCl₂ → 2 molecules NaCl + 1 molecule Ba(OH)₂

2 moles of NaOH + 1 mole BaCl₂ → 2 moles NaCl + 1 mole Ba(OH)₂

2. Sample problems: grams to grams



i. How many grams of BaCl₂ would you need to make 154.92 grams of NaCl?

Steps: 1. Change grams to moles of the given (the number that's unique to the problem)

2. Use the balanced equation to change moles of given to moles of the unknown

3. Change moles of unknown to grams of unknown

side work: Ba = 137.33 g/mol
2Cl = $\frac{70.90 \text{ g/mol}}{2}$
208.23 g/mol

Na = 22.99 g/mol
Cl = $\frac{35.45 \text{ g/mol}}{2}$
58.44 g/mol

$$154.92 \text{ g NaCl} \times \frac{1 \text{ mole NaCl}}{58.44 \text{ g NaCl}} \times \frac{1 \text{ mole BaCl}_2}{2 \text{ mole NaCl}} \times \frac{208.23 \text{ g BaCl}_2}{1 \text{ mole BaCl}_2} = 276.00 \text{ g BaCl}_2$$

ii. How many grams of NaOH would you need to completely react .982 grams of BaCl₂?

more side work: Na = 22.99 g/mol
O = 16.00 g/mol
H = $\frac{1.01 \text{ g/mol}}{2}$
40.00 g/mol

$$.982 \text{ g BaCl}_2 \times \frac{1 \text{ mole BaCl}_2}{208.23 \text{ g BaCl}_2} \times \frac{2 \text{ mole NaOH}}{1 \text{ mole BaCl}_2} \times \frac{40.00 \text{ g NaOH}}{1 \text{ mole NaOH}} = .377 \text{ g NaOH}$$